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EXAMINER	
PARSONS, THOMAS H	

ART UNIT	PAPER NUMBER
1745	6

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/674,978	Applicant(s) SADATOMI ET AL.	
	Examiner Thomas H Parsons	Art Unit 1745	

-- Th MAILING DATE of this communication appears on the cover sh et with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-22 and 24* is/are rejected.

7)☒ Claim(s) *23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the instant application is not within the range of 50 to 150 words. The Examiner suggests shortening the abstract as appropriate.

2. The disclosure is objected to because of the following informalities:

Page 3, line 2, suggest inserting "be" before "restricted";

Page 13, lines 8, 10, and 14, suggest defining "CZ", "FZ", and "ZL"; and,

Lien 21, the text "...of the plate is water-cooled..." appears awkwardly worded.

Appropriate correction is required.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 10 March 1999. It is noted, however, that applicant has not filed a certified copy of the Japanese application as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 7-13, 16, 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Penn (3,898,080).

Claim 1: Penn discloses a thermoelectric conversion material having a crystal structure in which an added element (Ge, which is instantly disclosed as a added element) is contained in an amount of 0.001 to 30 at% in silicon (25 at% as per col. 2: 12, and 15 at% as per col. 4: 6-8), and wherein silicon accounts for at least 80 at% of the polycrystal structure (col. 4: 6-8 which discloses 80-85 at%) (See also col. 3: 20-48, and col. 4: 5-62).

Although Penn does not explicitly disclose **at least one type of added element is deposited on crystal grains in the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Penn would inherently provide the claimed recitation as the material of Penn is of the same composition and is manufacture the same as instantly disclosed.

Claim 7: Penn discloses that the added element which generates carriers is used to make a p-type semiconductor and is boron (B)(col. 4: 10-11).

Claim 8: Penn discloses that the added element which generates carriers is used to make an n-type semiconductor and is phosphorous (P) (col. 4: 10-11).

Claim 9: Penn discloses that the added element that does not generate carriers is selected from Group IV elements (germanium which is instantly defined as a Group IV element) (col. 4: 10-11).

Claim 10: Penn discloses that the thermoelectric material is an ingot quenched from a melt (col. 4: 8-9).

Claim 11: Penn discloses a p-type or n-type semiconductor material wherein the material has the same composition as (same added element, dopant and at %) and is manufactured the same as instantly disclosed. Accordingly, the material of Penn would inherently provided a carrier concentration of 10^{17} to 10^{21} and a thermal conductivity of 50W/mK.

Claim 12: Penn discloses that the added element that does not generate carriers is germanium (which is instantly defined as a such) (col. 4: 10-11).

Claim 13: Penn discloses a step of cooling a melt such that added elements (germanium) are contained in silicon wherein the silicon accounts for at least 80 at% of the polycrystal structure (col. 4: 6-8 which discloses 80-85 at%) (col. 3: 20-48, and col. 4: 5-62).

Although Penn does not explicitly disclose **at least one type of added element is deposited on crystal grains in the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Penn would inherently provide the claimed recitation as the material of Penn is of the same composition and is manufacture the same as instantly disclosed.

Claim 16: Penn discloses a step of powderizing a material containing a added element in silicon (col. 4: 12-32), and a step of sintering the powder (hot press under conditions of temperature and pressure as instantly disclosed), and wherein the silicon accounts for at least 80

at% of the polycrystal structure (col. 4: 6-8 which discloses 80-85 at%) (col. 3: 20-48, and col. 4: 5-62).

Although Penn does not explicitly disclose **at least one type of added element is deposited on crystal grains in the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Penn would inherently provide the claimed recitation as the material of Penn is of the same composition and is manufacture the same as instantly disclosed.

Claim 18: Penn discloses a powder with an average crystal diameter of 1 to 50 μm (col. 4: 12-15) and an average particle diameter of 3 to 100 is sintered (32-43).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2, 4, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Penn.

Claim 2: Penn discloses a thermoelectric conversion material having a crystal structure in which dopant (col. 4: 10-11) and an added element (Ge, which is instantly disclosed as a added element) is contained in silicon, and wherein silicon accounts for at least 80 at% of the polycrystal structure (col. 4: 6-8 which discloses 80-85 at%) (See also col. 3: 20-48, and col. 4: 5-62).

Although Penn does not explicitly disclose at least one type of added element is deposited on crystal grains in which silicon, and at the grain boundary thereof, the thermoelectric material

of Penn would inherently provide the claimed recitation as the material of Penn is of the same composition and is manufacture the same as instantly disclosed.

Penn does not disclose a dopant contained in an amount of 0.001 to 20 at%. However, Penn teaches on col. 3: 51-54 a dopant in proportions appropriated for forming an alloy doped so as to have enhanced thermoelectric properties. Therefore, in light of the teaching of Penn, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the appropriate proportion of dopant that would have provided the desired figure of merit thereby improving the overall performance of thermoelectric devices.

Claim 4: Penn discloses a thermoelectric conversion material having a crystal structure in which a added element that does not generate carriers (Ge, which is instantly disclosed as a added element that does not generate carriers) is contained in an amount of 0.1 to 20 at% (15 at% as per col. 4: 6-8) and a dopant (col. 4: 10-11) that generates carriers is contained in silicon, and wherein wherein silicon accounts for at least 80 at% of the polycrystal structure (col. 4: 6-8 which discloses 80-85 at%) (See also col. 3: 20-48, and col. 4: 5-62).

Although Penn does not explicitly disclose at least one type of added element is deposited on crystal grains in which silicon, and at the grain boundary thereof, the thermoelectric material of Penn would inherently provide the claimed recitation as the material of Penn is of the same composition and is manufacture the same as instantly disclosed.

Penn does not disclose a dopant contained in an amount of 0.001 to 10 at%. However, Penn teaches on col. 3: 51-54 a dopant in proportions appropriated for forming an alloy doped so as to have enhanced thermoelectric properties. Therefore, in light of the teaching of Penn, it would have been obvious to one of ordinary skill in the art at the time the invention was made to

have selected the appropriate proportion of dopant that would have provided the desired figure of merit thereby improving the overall performance of thermoelectric devices.

Claim 17: Penn discloses a step of powderizing the material, sintering the powder, and cooling the material which is in contrast to the instantly claimed sequence of steps: cooling, powderizing, and sintering. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have changed the sequence of steps as it has been held that the selection of any order of performing process steps is prima facie obvious on the absence of new or unexpected results. Ex parte Rubin, 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render prima facie obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results); In re Gibson, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is prima facie obvious.).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

9. Claims 1-14 and 16-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamashita et al. (6,506,321).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claim 1: Yamashita et al. disclose a thermoelectric conversion material having a crystal structure in which a added element or a combination of added elements is or are contained in an amount of 0.001 to 30 at% in silicon (col. 5: 15-22).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is manufacture the same as instantly disclosed.

Claim 2: Yamashita et al. disclose a thermoelectric conversion material having a crystal structure in which a dopant or a combination of dopants that generate carriers is or are contained in an amount of 0.001 to 20 at% in silicon (0.5 to 20 at% as per col. 5: 19-21).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is manufacture the same as instantly disclosed.

Claim 3: Yamashita et al. disclose a thermoelectric conversion material having a crystal structure in which a dopant or a combination of dopants that generate carriers is or are contained in an amount of 0.001 to 20 at% in silicon (0.5 to 20 at% as per col. 5: 19-21), and an added element or a combination of added elements that do not generate carriers is or are contained in an amount of 0.1 to 10 at% (0.1 to 25 at% as per col. 5: 15-19).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is manufacture the same as instantly disclosed.

Claim 4: Yamashita et al. disclose a thermoelectric conversion material having a crystal structure in which a dopant or a combination of dopants that generate carriers is or are contained in an amount of 0.001 to 20 at% in silicon (0.5 to 20 at% as per col. 5: 19-21), and an added

element or a combination of added elements that do not generate carriers is or are contained in an amount of 0.1 to 10 at% (0.1 to 25 at% as per col. 5: 15-19).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is manufacture the same as instantly disclosed.

Claim 5: Yamashita et al. disclose a thermoelectric conversion material having a crystal structure in which a dopant or a combination of dopants that generate carriers is or are contained in an amount of 0.001 to 20 at% in silicon (0.5 to 20 at% as per col. 5: 19-21), and an added element or a combination of added elements that do not generate carriers is or are contained in an amount of 0.1 to 10 at% (0.1 to 25 at% as per col. 5: 15-19).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is manufacture the same as instantly disclosed.

Claim 6: Yamashita et al. disclose a thermoelectric conversion material having a crystal structure in which a added element or a combination of added elements that do not generate carriers is or are contained in an amount of 5 to 10 at% (0.1 to 25 at% as per col. 5: 15-19), at least one type of Group III-V compound semiconductor or Group II-VI compound semiconductor is contained in an amount of 1 to 10 at% (col. 15: 5-25 and Table 7-1), and a

dopant or a combination of dopants that do generate carriers is or are contained in an amount of 0.001 to 5 at % in silicon (0.5 to 20 at% as per col. 5: 19-22).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is manufacture the same as instantly disclosed.

Claim 7: Yamashita et al. disclose that of the added elements, the one that generates carriers and is used to make a p-type semiconductor is one or more selected from the group consisting of an Ap1 group (Be, Mg, Ca, Sr, Ba, Zn, Cd, Hg, B, Al, Ga, In, Tl) and transition metal elements M_1 (Y, Mo, Zr)(col. 3: 53-58).

Claim 8: Yamashita et al. disclose that of the added elements, the one that generates carriers and is used to make a n-type semiconductor is one or more selected from the group consisting of an An1 group (N, P, As, Sb, Bi, O, S, Se, Te), transition metal elements M_2 (Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Nb, Ru, Rh, Pd, Ag, Hf, Ta, W, Re, Os, Ir, Pt, Au; where Fe accounts for 10 at% or less), and rare earth elements RE (La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Yb, Lu) (col. 3: 58-64).

Claim 9: Yamashita et al. that of the added elements, the one that does not generate carriers is one or more types selected from the group consisting of Group IV elements other that silicon, Group III-V compound semiconductors, and Group II-VI compound semiconductors (col. 15: 15-25, Table 7-1; col. 7: 36-40).

Claim 10: Yamashita et al. disclose that the material is an ingot quenched from a melt, a sinter, and a material having a porosity of 5 to 40% (col. 29: 45-47; col. 31, Table 16-2 and 16-3, and col. 9: 34-43).

Claim 11: Yamashita et al. disclose that the material consists of a p-type or n-type semiconductor material whose carrier concentration is 10^{17} to 10^{21} (M/m^3) and whose thermal conductivity is not more that 50 W/mK) (col. 6: 54-57; col. 13, Table 3, nos. 19, 20; Table 4, nos. 40, 41, Tables 12-1, nos. 29, 30, Table 13-1, nos. 59, 60; and col. 7: 25-29).

Claim 12: Yamashita et al. discloses that the added element that does not generate carriers is germanium, and the carrier concentration of the semiconductor is 10^{17} to 10^{21} (M/m^3).

Claim 13: Yamashita et al. disclose a step of cooling a melt such that the added elements are contained in silicon (col. 8: 26-31).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is cooled the same as instantly disclosed.

Claim 14: Yamashita et al. disclose that the melting is arc melting or high-frequency melting (col. 8: 19-20).

Claim 16: Yamashita et al. disclose a step of powderizing (pulverizing) a material containing a added element in silicon, and a step of sintering the powder (col. 9: 34-47).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal**

structure, and at the grain boundary thereof, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is powderized and sintered the same as instantly disclosed.

Claim 17: Yamashita et al. disclose a step of cooling a melt such that added elements are contained in silicon, a step of powderizing the material thus obtained, and a step of sintering the powder (col. 9: 34-47).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is cooled, powderized and sintered the same as instantly disclosed.

Claim 18: Yamashita et al. disclose a powder with an average crystal grain diameter of 1 to 50 μm and an average particle diameter of 3 to 100 μm is sintered (col. 9: 34-47).

Claim 19: Yamashita et al. disclose a step of coating a silicon powder with a added element or embedding the latter in the former, and a step of sintering the silicon powder.

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and the step of coating or embedding is the same as instantly disclosed.

Claim 20: Yamashita et al. disclose that the added element is contained in the silicon itself (col. 9: 34-38)

Claim 21: Yamashita et al. disclose that the coating step is a vapor phase growth process (col. 36: 49-50).

Claim 22: Yamashita et al. disclose that the embedding step is mechanofusion treatment (i.e. microcrystallization by mechanical alloying) (col. 9: 41-42).

Claim 24: Yamashita et al. disclose a step of cooling a melt such that added elements are contained in silicon, a step of powderizing the material thus obtained, and a step of sintering (low temperature hot pressing) the powder (col. 9: 34-47).

Although Yamashita et al. do not explicitly disclose **at least one type of added element is deposited on crystal grains in which silicon accounts for at least 80 % of the polycrystal structure, and at the grain boundary thereof**, the thermoelectric material of Yamashita et al. would inherently provide the claimed recitation as the material of Yamashita et al. is of the same composition and is cooled, powderized and sintered the same as instantly disclosed.

10. Claim15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita et al. as applied to claim13 above, and further in view of Arita et al. (Thermoelectric Properties of Ru_2Si_3 Prepared by Fz and Arc Melting Methods.

Yamashita et al. are as applied, argued, and disclosed above, and incorporated herein.

Yamashita et al. do not disclose a CZ method, an FZ method, or a ZL method.

Arita at al. disclose a method of manufacturing a similar thermoelectric conversion material by an FZ method.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Yamashita et al. by incorporating the FZ

method of Arita et al. because Arita et al. teach an FZ method that would have provided a thermoelectric conversion material having a large value of Figure of merit mainly due to high electric conductivity (page 396, col. 2, lines 1-5) thereby improving the overall performance of energy conversion.

Allowable Subject Matter

11. Claim 23 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Indicating Allowable Subject Matter

12. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose forming and laminating layers of silicon and layers including added elements, either alternately or in the required pattern and subjecting the laminated layers to a heat treatment.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H Parsons whose telephone number is (703) 306-9072. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (703) 308-2383. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Thomas H Parsons
Examiner
Art Unit 1745

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Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700